



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
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November 2, 2011

Mr. Michael J. Pacilio
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: OYSTER CREEK GENERATING STATION - NRC INTEGRATED INSPECTION
REPORT 05000219/2011004

Dear Mr. Pacilio:

On September 30, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Oyster Creek Generating Station. The enclosed inspection report documents the inspection results, which were discussed on October 17 with Mr. M. Massaro, Site Vice President, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based upon the results of this inspection, no findings were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

Eugene M. DiPaolo, Acting Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket No.: 50-219
License No.: DPR-16

Enclosure: Inspection Report 05000219/2011004
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

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Sincerely,
/RA/
Eugene M. DiPaolo, Acting Chief
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U.S. NUCLEAR REGULATORY COMMISSION**REGION I**

Docket No.: 50-219

License No.: DPR-16

Report No.: 05000219/2011004

Licensee: Exelon Nuclear

Facility: Oyster Creek Generating Station

Location: Forked River, New Jersey

Dates: July 01, 2011 – September 30, 2011

Inspectors: J. Kulp, Senior Resident Inspector
J. Ambrosini, Resident Inspector
R. Nimitz, Senior Health Physicist
C. Cahill, Senior Reactor Analyst
R. Montgomery, Resident Inspector (Acting)
C. Williams, Reactor Inspector

Approved By: E. DiPaolo, Acting Chief
Reactor Projects Branch 6
Division of Reactor Projects

Enclosure

TABLE OF CONTENTS

SUMMARY OF FINDINGS.....	3
REPORT DETAILS	4
1. REACTOR SAFETY	4
1R01 Adverse Weather Protection.....	4
1R04 Equipment Alignment	5
1R05 Fire Protection.....	5
1R06 Flood Protection Measures.....	6
1R11 Licensed Operator Requalification Program	6
1R12 Maintenance Effectiveness.....	7
1R13 Maintenance Risk Assessments and Emergent Work Control	7
1R15 Operability Determinations and Functionality Assessments.....	8
1R19 Post-Maintenance Testing.....	9
1R22 Surveillance Testing.....	9
1EP6 Drill Evaluation	10
2. RADIATION SAFETY	10
RS07 Radiological Environmental Monitoring Program (REMP) (71124.07)	10
4. OTHER ACTIVITIES.....	12
4OA1 Performance Indicator Verification.....	12
4OA2 Problem Identification and Resolution	13
4OA3 Follow-Up of Events (71153 – 3 samples).....	13
4OA5 Other Activities	14
4OA7 Licensee-Identified Violations	16
ATTACHMENT: SUPPLEMENTARY INFORMATION	16
SUPPLEMENTARY INFORMATION	A-1
KEY POINTS OF CONTACT	A-1
LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED	A-1
LIST OF DOCUMENTS REVIEWED	A-2
LIST OF ACRONYMS.....	A-9

SUMMARY OF FINDINGS

IR 05000219/2011004; July 1 - September 30, 2011; Oyster Creek Generating Station;
Integrated Report

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

No findings were identified.

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REPORT DETAILS

Summary of Plant Status

Oyster Creek began the inspection period at 100 percent power. Operators performed short duration unplanned power reductions on July 19, 21, 22, 23, 24, 25, 26, 27, and 31 and August 1 and 6 to adhere to environmental thermal discharge permit limitations. The operators returned the plant to 100 percent power following each of these power reductions.

On July 28, operators performed an unplanned power reduction to 70 percent power due to loss of the B 34.5kV bus which interrupted power to the dilution pumps. Power was subsequently lowered to 52 percent to adhere to environmental thermal discharge permit limitations. Following restoration of power to the dilution pumps, operators returned the plant to 100 percent power on July 29.

On July 29, operators performed an unplanned power reduction to 70 power due to a loss of power to the dilution pumps caused by a lightning strike on the Q121 offsite power line. Following restoration of power to the dilution pumps, operators returned the plant to 100 percent power on July 30.

On August 23, operators performed an unplanned power reduction to 70 percent to perform repairs to the A reactor feedwater pump. The plant returned to 100 percent power on August 25.

On August 27, operators commenced an unplanned reactor shutdown due to the approach of Hurricane Irene. Cold shutdown was achieved on August 28. After consultation with the State of New Jersey and the Federal Emergency Management Agency (FEMA) on August 28, operators commenced a reactor startup and returned the plant to 100 percent power on August 30.

On August 31, operators reduced power to 70 percent to perform a rod pattern adjustment. The plant returned to 100 percent power later the same day.

On September 21, operators performed an unplanned power reduction to 65 percent power to repair leaking tubes in the B main condenser. The plant returned to 100 percent power on September 22.

Oyster Creek remained at or near 100 percent power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 1 sample)

.1 Evaluate Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors reviewed Exelon's preparations and readiness for Hurricane Irene from August 25 through August 28. The inspectors performed walkdowns of the areas that

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could be impacted by hurricane conditions such as the intake structure, emergency diesel building and transformer yard. The walkdown verified that station personnel secured loose materials prior to the arrival of high winds and implemented compensatory actions specified in Exelon severe weather procedures. The inspectors verified that Exelon monitored the approach of the storm and took appropriate actions as required. The inspectors provided continuous onsite coverage starting prior to arrival of the storm on August 27 until the storm passed on August 28. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04Q – 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Containment spray system 2 with containment spray system 1 unavailable during surveillance testing on July 12
- A isolation condenser while B isolation condenser was unavailable due to planned maintenance on August 11
- Core spray system 2 with core spray system 1 unavailable during surveillance testing on September 6
- 1-2 Service water pump while 1-1 service water pump was unavailable due to planned maintenance on September 19

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, technical specifications, work orders, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted system performance of their intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether Exelon staff had properly identified equipment issues and entered them into the corrective action program for resolution with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Resident Inspector Quarterly Walkdowns (71111.05Q – 6 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that Exelon controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures. Documents reviewed are listed in the Attachment.

- New warehouse (NW-FA-23) on July 7
- Northeast corner room (RB-FZ-1F4) on July 11
- 480V switchgear room B (OB-FZ-6B) on August 4
- A and B battery room (OB-FZ-8C) on August 11
- Turbine operating floor (TB-FZ-11A) on August 23
- Torus room (RB-FA-2) on September 15

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 samples)

.1 Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to assess susceptibilities involving internal flooding. The inspectors also reviewed the corrective action program to determine if Exelon identified and corrected flooding problems and whether operator actions for coping with flooding were adequate. The inspectors also focused on the southeast corner room of the reactor building/turbine building which contains the containment spray C and D pumps to verify the adequacy of equipment seals located below the flood line, floor and water penetration seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program (71111.11 – 1 sample)

Resident Inspector Quarterly Review

a. Inspection Scope

The inspectors observed licensed operator simulator training scenario 2612.CREW.11-5.01 on August 24. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the technical specification action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12 – 2 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on SSC performance and reliability. The inspectors reviewed system health reports, corrective action program documents, maintenance work orders, and maintenance rule basis documents to ensure that Exelon was identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the SSC was properly scoped into the maintenance rule in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by Exelon staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these SSCs to (a)(2). Additionally, the inspectors ensured that Exelon staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries. Documents reviewed are listed in the Attachment.

- Containment spray heat exchangers (IR 1193928) on July 25
- Isolation condenser initiation logic relays (IR 1178900) on August 8

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 4 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that Exelon performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that Exelon personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the

assessments were accurate and complete. When Exelon performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met. Documents reviewed are listed in the Attachment.

- Containment spray system 1 unavailable due to surveillance testing during a grid heavy load voltage warning on July 12
- Standby gas treatment system 2 unplanned outage for maintenance on August 8
- Service water pump 1-1 and A control room ventilation system unavailable due to planned maintenance on September 19
- 1-1 reactor building closed cooling water (RBCCW) heat exchanger unavailable for unplanned corrective maintenance with 1-1 RBCCW pump unavailable due to planned corrective maintenance on September 27

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 4 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions:

- Low pressure carbon dioxide system on July 12 (IR 1239504)
- 'B' isolation condenser steam supply valve (V-14-33) stroke time on August 17 (IR 1250414)
- Safety relief valve acoustic monitoring system operability on August 23 (IR 1252766)
- CV-305-127\42-19 - Control rod drive outlet scram valve air leak on September 22 (IR 1265624)

The inspectors selected these issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the operability determinations to assess whether technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and UFSAR to Exelon's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by Exelon. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 5 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed the test procedure to verify that the procedure adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure was consistent with the information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions. Documents reviewed are listed in the Attachment.

- B isolation condenser steam inlet valve (V-14-33) on August 11 (C2026219)
- 1 diesel fire pump starting battery replacement on August 12 (R2148297)
- 2 diesel fire pump following annual preventive maintenance on September 3 (R2169826/ R2180110)
- #2 emergency diesel generator planned maintenance on September 16 (R2143612)
- 1-1 service water pump preventive maintenance on September 19 (R2187785)

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 4 samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied technical specifications, the UFSAR, and Exelon procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. Documents reviewed are listed in the Attachment. The inspectors reviewed the following surveillance tests:

- Firewater makeup to isolation condensers inservice test on July 6
- Containment spray and emergency service water system 1 pump operability and inservice test on July 12
- Standby gas treatment system 10-hour run – system 1 on August 15
- Core spray valve operability and inservice test on September 1

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 – 1 sample)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine Exelon emergency drill on August 31 to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator, technical support center, and emergency operations facility to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the station drill critique to compare inspector observations with those identified by Exelon staff in order to evaluate Exelon's critique and to verify whether the Exelon staff was properly identifying weaknesses and entering them into the corrective action program. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety [OS]

RS07 Radiological Environmental Monitoring Program (REMP) (71124.07)

a. Inspection Scope (1 Sample)

The inspectors reviewed Oyster Creek's annual radiological environmental and effluent operating reports (2009, 2010) and the results of Exelon's assessments to verify that the REMP was implemented in accordance with technical specifications (TS) and the offsite dose calculation manual (ODCM). The inspectors reviewed the report for changes to the ODCM with respect to environmental monitoring, commitments in terms of sampling locations, monitoring and measurement frequencies, land use census, inter-laboratory comparison program, and analysis of data.

The inspectors reviewed the ODCM and associated maps to identify locations of environmental monitoring stations. The inspectors also reviewed the updated final safety analysis report (UFSAR) for information regarding the environmental monitoring program and meteorological monitoring instrumentation.

The inspectors reviewed quality assurance (QA) audit results of the program to assist in selection of samples. The inspectors reviewed available audits and technical evaluations performed on the vendor's program, as applicable, if used to analyze REMP samples.

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The inspectors reviewed the annual effluent release report and the 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," report, to determine if Exelon was appropriately sampling for the predominant and dose-causing radionuclides likely to be released in effluents.

The inspectors observed the collection and preparation of various environmental samples from different environmental media (three particulate and iodine air monitoring stations, one drinking water locations, and one surface water location). Documents reviewed are listed in the Attachment.

Site Inspection

The inspectors walked down and observed sample collection for three air sampling stations (ST-66, ST-72, and ST-73), three thermoluminescent dosimeter (TLD) monitoring stations (ST-66, ST-72, and ST-73), one drinking water station (Station 114), and one surface water sample (Station 33) to determine whether the stations were located as described in the ODCM. The inspectors also reviewed Exelon gardens (ST 66 and ST 35) and reviewed material conditions of monitoring equipment. Consistent with smart sampling techniques, the inspectors selected air sampling station locations based on the locations with the highest X/Q, D/Q wind sectors selected the TLD stations based on the most risk-significant locations.

The inspectors observed the collection and preparation of various environmental samples from different environmental media (three particulate and iodine air monitoring stations, one drinking water locations, and one surface water location). The inspectors verified that environmental sampling was representative of the release pathways as specified in the ODCM and that sampling techniques were in accordance with controlled procedures.

For the air samplers and TLDs, the inspectors reviewed the calibration and maintenance records/data (orifices, vacuum gauge) to verify that they demonstrate operability of these components.

The inspectors evaluated Exelon's criteria for sampling of other media upon loss of a required sampling station.

Based on direct observation and review of records, the inspectors verified that the meteorological instruments were operable, calibrated, and maintained in accordance with guidance contained in the FSAR, NRC Regulatory Guide 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," and Exelon procedures. The inspectors verified that the meteorological data readout and recording instruments in the control room and at the tower were operable. The inspectors toured the meteorological tower and reviewed meteorological data readouts. The inspectors compared readouts with control room indications. The inspectors reviewed monthly meteorological monitoring reports.

The inspectors verified that missed and or anomalous environmental samples were identified and reported in the annual environmental monitoring report. The inspectors selected events that involved a missed sample, an inoperable sampler, a lost TLD, or an anomalous measurement, and verified that Exelon had identified the cause and implemented corrective actions. The inspectors reviewed Exelon's assessment of any

positive sample results (i.e., licensed radioactive material detected above the lower limits of detection (LLD). The inspectors reviewed the associated radioactive effluent release data that was the source of the released material.

The inspectors selected structures, systems, or components (SSCs) that involve or could reasonably involve licensed material for which there is a credible mechanism for licensed material to reach groundwater, and verified that Exelon had implemented a sampling and monitoring program sufficient to detect leakage of these SSCs to groundwater. The inspectors reviewed the Annual 2010 Radiological Ground Water Protection Program Report.

The inspectors verified that records, as required by 10 CFR 50.75(g), of leaks, spills, and remediation generated since the previous inspection, were being retained in a retrievable manner.

The inspectors reviewed any significant changes made by Exelon to the ODCM as the result of changes to the land use census, long-term meteorological conditions (e.g., three-year average) or modifications to the sampler stations. The inspectors reviewed technical justifications for any changed sampling locations. The inspectors verified that Exelon performed the reviews required to ensure that the changes did not affect its ability to monitor the impacts of radioactive effluent releases on the environment.

The inspectors verified that appropriate detection sensitivities with respect to TS/ODCM were used for counting samples (i.e., the samples meet the TS/ODCM required LLDs). The inspectors reviewed quality control charts, as appropriate, for maintaining radiation measurement instrument status and actions taken for degrading detector performance, as applicable. For vendor laboratory analysis results for REMP samples, the inspectors reviewed the results of the vendor's quality control program, including the inter- and intra-laboratory comparison program, to verify the adequacy of the vendor's program.

The inspectors reviewed the results of Exelon's inter-laboratory comparison program to verify the adequacy of environmental sample analyses performed by Exelon. The inspectors verified that the inter-laboratory comparison test included the media/nuclide mix appropriate for the facility. The inspectors reviewed as applicable, Exelon's determination of any bias to the data and the overall effect on the REMP.

Identification and Resolution of Problems

The inspectors determined if problems associated with the REMP were being identified by Exelon at an appropriate threshold and were properly addressed for resolution in the corrective action program. In addition to the above, the inspectors verified the appropriateness of the corrective actions for a selected sample of problems documented by Exelon that involve the REMP.

b. Findings

No findings were identified.

4. **OTHER ACTIVITIES**

4OA1 Performance Indicator Verification (71151)

Enclosure

.1 Reactor Coolant System (RCS) Specific Activity and RCS Leak Rate (2 samples)

a. Inspection Scope

The inspectors reviewed Exelon's submittal for the RCS specific activity and RCS leak rate performance indicators for the period of July 1, 2010 and June 30, 2011. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors also reviewed RCS sample analysis and control room logs of daily measurements for RCS leakage, and compared that information to the data reported by the performance indicator. Documents reviewed are listed in the Attachment.

b. Inspection Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 1 sample)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that Exelon entered issues into the corrective action program at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the corrective action program and periodically attended condition report screening meetings.

b. Findings

No findings were identified.

4OA3 Follow-Up of Events (71153 – 3 samples)

.1 Plant Events

a. Inspection Scope

For the plant events listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that Exelon made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR Parts 50.72 and 50.73. The inspectors reviewed Exelon's follow-up actions related to the events to assure that Exelon implemented appropriate corrective actions

commensurate with their safety significance. Documents reviewed are listed in the Attachment.

- Loss of the B 34.5kV electrical bus on July 28
- Declaration of Unusual Event due to seismic activity on August 23
- Response to Hurricane Irene during the period August 25-28

b. Findings

No findings were identified.

4OA5 Other Activities

.1 Follow-up On Traditional Enforcement Actions (IP 92702) (1 sample)

a. Inspection Scope

The U.S. Nuclear regulatory Commission Office of Investigations completed an investigation at Oyster Creek Nuclear Generating Station (OCNGS) on January 14, 2010 which confirmed that a contract employee, who had unescorted access to vital areas of the plant, deliberately failed to report an arrest while employed for Bartlett at OCNGS. The contract employee's action caused Exelon to be in violation of License Condition 2.C.(4) of the OCNGS operating license and Section 9.1 of the OCNGS Physical Security Plan. A severity level IV non-cited violation was issued in investigation report I-2009-047 (ML092580013) on April 12, 2010. The inspectors reviewed Exelon's corrective actions, ensured that any generic implications were addressed, and verified that Exelon's programs and practices are adequate to prevent recurrence. No inadequacies were noted. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2 Independent Spent Fuel Storage Installation (ISFSI) (60855.1)

a. Inspection Scope (1 Sample)

The inspector reviewed routine operational surveillance data, including radiological surveillance, for the ISFSI facility. The inspector toured the facility, reviewed TLD monitoring data, and made independent radiation measurements. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.3 (Closed) NRC Temporary Instruction 2515/177 - Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal and Containment Spray Systems

a. Inspection Scope

The inspectors performed the inspection in accordance with Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal and Containment Spray Systems." The NRC staff developed TI 2515/177 to support the NRC's confirmatory review of Exelon's responses to NRC Generic Letter (GL) 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal and Containment Spray Systems." Based on a review of Exelon's GL 2008-01 response letters, the Office of Nuclear Reactor Regulation (NRR) staff provided additional plant specific guidance on inspection scope to the regional inspectors. The inspectors used this inspection guidance along with the TI to verify that Exelon implemented or was in the process of acceptably implementing the commitments, modifications, and programmatically controlled actions described in their GL 2008-01 response. The inspectors verified that the plant-specific information (including licensing basis documents and design information) was consistent with the information that Exelon submitted to the NRC in response to GL 2008-01.

The inspectors reviewed a sample of isometric drawings, and piping and instrument diagrams, and conducted selected system piping walkdowns to verify that Exelon's drawings reflected the subject system configurations and Updated Final Safety Analysis Report (UFSAR) descriptions. Specifically, the inspectors verified the following related to a sample of isometric drawings for the core spray, containment spray, isolation condenser and shutdown cooling systems:

- High point vents were identified;
- High points that did not have vents were recognized and evaluated with respect to their potential for gas buildup;
- Other areas where gas could accumulate and potentially impact subject system operability, such as orifices in horizontal pipes, isolated branch lines, heat exchangers, improperly sloped piping, and under closed valves, were acceptably evaluated in engineering reviews or had ultrasonic testing (UT) points which would reasonably detect void formation; and,
- For piping segments reviewed, branch lines and fittings were clearly shown.

The inspectors conducted walkdowns of portions of the above systems to evaluate the acceptability of Exelon's drawings utilized during their review of GL 2008-01. The inspectors verified that Exelon conducted walkdowns of the applicable systems to confirm that the combination of system orientation, vents, instructions and procedures, tests, and training, would ensure that each system was sufficiently full of water to ensure operability. The inspectors reviewed Exelon's methodology used to determine system piping high points, identification of negative sloped piping, and calculations of void sizes based on UT equipment readings, to ensure the methods were reasonable. The inspectors also reviewed engineering analyses associated with the development of acceptance criteria for as-found voids. The review included engineering assumptions for void transport and acceptability of void fractions at the suction and discharge piping of the applicable system pumps. In addition, the inspectors verified that Exelon's review included all emergency core cooling systems, along with supporting systems, within scope of the GL.

The inspectors reviewed a sample of Exelon's procedures used for filling and venting the associated GL 2008-01 systems to verify that the procedures were effective in venting or reducing voiding to acceptable levels. The inspectors reviewed a sample of system venting and UT surveillance results to ensure proper implementation of the surveillance program.

The inspectors reviewed corrective action program (CAP) documents to verify that selected actions described in Exelon's nine month and supplemental submittals were acceptably documented including completed actions, and implementation schedule for incomplete actions. The inspectors also verified that the NRC commitments in Exelon's submittals were included in the CAP. Additionally, the inspectors reviewed evaluations and corrective actions for various issues Exelon identified during their GL 2008-01 review. The inspectors performed this review to ensure Exelon appropriately evaluated and adequately addressed any gas voiding concerns. Finally, the inspectors reviewed Exelon's training associated with gas accumulation to assess if appropriate training had been provided to the operations and engineering support staff to ensure appropriate awareness of the effects of gas voiding. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified. This completes the inspection requirements for TI 2515/177.

4OA6 Meetings, Including Exit

On October 17, the inspectors presented the inspection results to Mr. M. Massaro, and other members of the Exelon staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-Identified Violations

None

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

M. Massaro, Site Vice-President
R. Peak, Plant Manager
D. Dicello, Director, Work Management
M. McKenna, Director, Operations
G. Malone, Director, Engineering
C. Symonds, Director, Training
J. Dostal, Director, Maintenance
J. Barstow, Manager, Regulatory Assurance
T. Keenan, Manager, Security
M. Ford, Manager, Environmental/Chemistry
J. Renda, Manager, Site Radiation Protection
A. Farenga, Manager, Radiological Engineering
D. Chernesky, Assistant Director, Maintenance
R. Skelsky, Senior Manager, Systems Engineering
H. Ray, Senior Manager, Design Engineering
G. Flesher, Shift Operations Superintendent
J. McDaniel, Manager, Nuclear Oversight
M. Rossi, Requal Training Lead
M. Seeloff, Manager, Corrective Action Program
J. Chrisley, Regulatory Assurance Specialist
J. Kerr, Regulatory Assurance Specialist
K. Wolf, Radiation Protection Support Manager
M. Nixon, Chemistry Supervisor
D. Moore, Regulatory Assurance Specialist
J. McCarthy, Radiological Engineer
K. Martin, Project Manager, IFSI
S. Schwartz, Design Engineer

Others:

State of New Jersey, Bureau of Nuclear Engineering

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened/Closed

None

Opened

None

Closed

None

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

OP-OC-108-109-1001, Preparation for Severe Weather T&RM for Oyster Creek, Revision 11
 OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 6
 WC-AA-107, Seasonal Readiness, Revision 9
 OP-OC-108-1001, Preparation for Severe Weather T&RN for Oyster Creek, Revision 1
 OP-OC-108-109-1002, Cold Weather Freeze Inspection, Revision 4
 ABN-31, High Winds, Revision 15
 ABN-32, Abnormal Intake Level, Revision 18

Condition Reports (IR)

1256245 1255744 1256409 1256421

Section 1R04: Equipment Alignment

Procedures

310, Containment Spray System Operation, Revision 102
 307, Isolation Condenser System, Revision 103

Drawings

GE148F740, Containment Spray System Flow Diagram
 GE148F262, Emergency Condenser Flow Diagram
 GE885D781, Core Spray System Flow Diagram
 BR 2005, Reactor & Turbine Building Service Water System Flow Diagram

Section 1R05: Fire Protection

Procedures

ABN-29, Plant Fires, Revision 26
 101.2, Oyster Creek Site Fire Protection Program, Revision 67
 CC-AA-211, Fire Protection Program, Revision 4
 333, Plant Fire Protection System, Revision 106
 OP-AA-201-010-1001, B.5.B Mitigating Strategies Equipment Expectations, Revision 0

Miscellaneous

Oyster Creek Generating Station Pre-Fire Plan: RB-FZ-1F4, Reactor Building (-19' Elevation)
 Northeast Corner Room
 Oyster Creek Generating Station Pre-Fire Plan: NW-FA-23, New Warehouse
 Oyster Creek Generating Station Pre-Fire Plan: OB-FZ-6B, 480V Switchgear Room "B"
 Oyster Creek Generating Station Pre-Fire Plan: OB-FZ-8C, A and B Battery Room, Electric Tray
 Room
 Oyster Creek Generating Station Pre-Fire Plan: TB-FZ-11A, Turbine Operating Floor (46'-0"
 Elevation)
 Oyster Creek Generating Station Pre-Fire Plan: RB-FA-2, Reactor Building (Drywell and Torus)
 Guest Trolling Charger Series Owner's Manual, On Board Battery Chargers

Section 1R06: Flood Protection MeasuresCondition Reports (IR)

813797	813958	810465	821411	1240067	85247
1201634	1184058	1105157	427972		

Work Orders (AR)

R2095953	C2018682
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Miscellaneous

Information Notice 2005-30, Safe Shutdown Potentially Challenged by Unanalyzed Internal Flooding Events and Inadequate Design
 C-1302-822-E610-076, Flooding Due to HELB Outside Containment
 28063-005, Design and Licensing Bases for Flooding at OCGS
 OCGS Internal Flood Evaluation Summary and Notebook

Section 1R11: Licensed Operator Regualification ProgramMiscellaneous

EOP User's Guide (2000-BAS-3200.02)
 2612.CREW.11-5.01

Section 1R12: Maintenance EffectivenessProcedures

ER-AA-310, Implementation of Maintenance Rule, Revision 8
 ER-AA-310-1005, Maintenance Rule - Disposition Between (a)(1) and (a)(2) , Revision 5
 LS AA-125-1003, Apparent Cause Evaluation Manual, Revision 9
 CC-AA-309-1012, 10 CFR Part 21 Technical Evaluations, Revision 2

Condition Reports (IR)

1193928	985629	874285	983355	1208455	1193928
618930	1178900	932736	879452	1247448	1212922
1055456	1206399	1055456			

Miscellaneous

NEI 93-01, Industry Guideline for monitoring the Effectiveness of Maintenance at Nuclear Power Plants
 C-1302-241-5450-073, Acceptable Containment Spray Heat Exchanger Fouling Resistance
 C-1302-241-E610-080, Calculation of Torus Pool Temperature for NPSH and to Determine Containment Spray System Design Basis Requirements, Revision 4
 TDR 993, Evaluation of Containment Spray/ESW Performance at Elevated Intake Temperature
 NRC Information Notice 2007-40, Inadequate Implementation of 10 CFR Part 21 Requirements by Vendors who Supply Basic Components to Nuclear Power Plant Licensees

Section 1R13: Maintenance Risk Assessments and Emergent Work ControlProcedures

ER-AA-600-1042, On-line Risk Management, Revision 7
 ER-AA-600-1021, Risk Management Application Methodologies, Revision 4
 ER-AA-600-1014, Risk Management Configuration Control, Revision 6

ER-AA-600-1011, Risk Management Program, Revision 9
 WC-OC-101-1001, On-line Risk Management and Assessment, Revision 8
 ABN-60, Grid Emergency, Revision 9

Condition Report (IR)
 1268453

Section 1R15: Operability Evaluations

Procedures

OP-AA-108-115, Operability Determination, Revision 10
 101.2, Oyster Creek Site Fire Protection Program, Revision 67
 413, Operation of the Safety valve/EMRV Acoustic Monitoring System, Revision 19
 602.3.008, Main Steam Line Safety/ EMRV Acoustic VMS Test, Revision 29

Condition Reports (IR)

1239504	1057101	1250414	761954	1252766	1265624
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Work Orders (AR)

A2112538	A2248892	C2020245	A2276012	A2283257
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Miscellaneous

NRC Inspection Manual - Part 9900 Technical Guidance, Operability Determinations &
 Functionality Assessments for Resolution of Degraded or Nonconforming Conditions
 Adverse to Quality or Safety
 2611-PGD-2621, Nuclear Plant Operator Initial Training Course, Fire Protection Program
 NFPA 12, Standard on Carbon Dioxide Extinguishing Systems, 2000 edition
 990-1746, Oyster Creek Nuclear Generating Station Fire Hazards Analysis Report
 C-1302-730-5350-017, Stroke Time Calculation for GL 89-10 MOVs
 SE-328212-003, GL 89-10 Motor Operated Valve Modification
 Oyster Creek Generating Station UFSAR, Table 6.3-1, Isolation Condenser System
 Components
 ASME OM Code-1995, Code for Operation and Maintenance of Nuclear Power Plants,
 Subsection ISTC, Inservice Testing of Valves in Light-Water Reactor Power Plants
 Oyster Creek Generating Station Pre-Fire Plan: TB-FA-3A/3B, 4160V C & D Vaults

Section 1R19: Post-Maintenance Testing

Procedures

MA-AA-716-012, Post Maintenance Testing, Revision 15
 OP-MA-109-101, Clearance and Tagging, Revision 12
 645.4.001, Fire Pump #1 Operability Test, Revision 65
 645.4.018, Fire Pump Monitoring Test, Revision 62
 636.4.013, Diesel Generator #2 Load Test, Revision 36
 641.4.001, Service Water Pump Operability and In-Service Test, Revision 70

Condition Report (IR)

1244421	761954	1250988	1250909	1250917	1259347
1259343					

Work Order (AR)

C2026219	A2283257	C2025687	A2276012	A2236563	R2148297
R2169826	R2180110	R2143612	R2187785		

Miscellaneous

C-1302-730-5350-017, Stroke Time Calculations for the GL 89-10 MOVs
 SE-315403-032, Justification for IC AC Condensate Valves Revised Open Area

Section 1R22: Surveillance TestingProcedures

SA-AA-129, Electrical Safety, Revision 7
 MA-AA-1000, Conduct of Maintenance, Revision 14
 609.4.007, Fire Water Makeup to Isolation Condensers In-Service Test, Revision 19
 607.4.014, Containment Spray and ESW System 1 Pump Operability, IST and Containment
 Spray Pumps Trip, Revision 37
 610.4.003, Core Spray Valve Operability and In-Service Test, Revision 40
 651.4.002, Standby Gas Treatment System 10-Hour Run – System 1, Revision 5

Condition Reports (IR)

1236410	1240072	1099012
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Work Orders (AR)

R2183971	A2280062	R2165849	R2186029	R2186125
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Miscellaneous

NRC Inspection Manual Part 9900 Technical Guidance, Maintenance- Preconditioning of
 Structures, Systems, and Components Before Determining Operability
 Oyster Creek UFSAR Section 6.2.2, Containment Heat Removal System

Section 1EP6: Drill EvaluationProcedures

EP-AA-1010, Radiological Emergency Plan Annex for Oyster Creek Station, Revision 3

Condition Reports

1258579	1258580	1258577	1258397	1258396	1258394
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Miscellaneous

Oyster Creek 2011 Pre-Exercise Evaluation Report, dated 9/25/2011

Section RS07 Radiological Environmental Monitoring ProgramProcedures

CY-AA-170-000, Radioactive Effluent and Environmental Monitoring Program, Revision 4
 CY-AA-170-100, Radiological Environmental Monitoring Program, Revision 2
 CY-AA-170-200, Radioactive Effluent Control Program, Revision 1
 CY-AA-130-201, Radiochemistry Quality Control, Revision 0
 CY-AA-170-300, Offsite Dose Calculation Manual Administration, Revision 2
 CY-AA-170-1000, Radiological Environmental Monitoring Program and Meteorological
 Program Implementation, Revision 5

CY-AA-170-1100, Quality Assurance for Radiological Monitoring Program, Revision 1
CY-OC-120-1200, REMP sample Collection - Well Water, Revision 1
CY-AA-170-2000, Annual Radioactive Effluent Release Report, Revision 5
CY-OC-170-2001, Quality Control for Radioactive Effluents, Revision 0
CY-AA-170-2300, Determination of Carbon 14 in Gaseous Effluents, Revision 0
CY-AA-170-3100, Offsite Dose Calculation Manual Revision, Revision 3
EN-AA-408, Radiological Ground water Protection Program, Revision 0
EN-AA-408-4000, Radiological Ground Water Protection Program Implementation, Revision 0

Work Orders (AR)

A1068813

Miscellaneous

Orifice Calibration data – 2693411, 2693413, 2693421
Meteorological Data Summary (2000-2009)
Annual Metrological Monitoring Report 2010
NUPIC CGI Audit, March 2011
Annual Report TB Engineering Environmental Service (January-December 2010)
10 CFR 50.75(g) file
Check-in Self-Assessments
2010 Land Use Census
Annual Radiological Environmental, Effluent Release Reports- 2009, 2010
Quality Assurance Confirmatory Testing of Environmental TLDs

Section 40A1: Performance Indicator Verification

Procedures

LS-AA-2001, Collecting and Reporting of NRC Performance Indicator Data, Revision 14

Miscellaneous

Reactor coolant chemistry logs, dated July 2010 through June 2011
Drywell identified and unidentified leak rate logs, dated July 2010 through June 2011
Oyster Creek Performance Indicator Summary dated 7/20/2011
NEI 99-02, Regulatory Assessment Performance Indicator Guideline
NEI 99-02 Frequently Asked Question Archive, dated 10/13/10

Section 40A2: Problem Identification and Resolution

Miscellaneous

Check-in Assessments
ANI Assessment, March 2011
Audit SR-2011-009, February 2011, NUPIC Audit (Teledyne Brown)
DOE MAPEP
Teledyne Brown Engineering Quarterly Reports

Section 40A3: Followup of Events

Procedures

ABN-21, Radwaste Service Water Failure, Revision 5
ABN-22, AOG Building Loss of Power, Revision 7
ABN-52, Loss of USS 1E1, Revision 5

ABN-56, Loss of the J69361 North Yard Distribution System, Revision 5
 ABN-57, Loss of Site Emergency Building Power and/or the Plant Process Computer system
 UPS, Revision 8
 ABN-38, Station Seismic Event, Revision 11
 ABN-31, High Winds, Revision 15
 ABN-32, Abnormal Intake Level, Revision 18
 OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 6
 OP-OC-108-109-1001, Preparation for Severe Weather T&RM for Oyster Creek, Revision 11

Condition Reports (IR)

1245786	1246235	1245329	1245293	1243571	1256409
1256421	1256445	1256245	1256349	1254651	1257675
1257893					

Miscellaneous

NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73
 ENS Notification 47107, Offsite Notification Due to Fish Kill Event
 ENS Notification 47188, Notification of an Unusual Event due to a Seismic Event
 Oyster Creek UFSAR, Figure 8.2-3, 34.5 kV Substation – One Line Diagram
 Oyster Creek Operations Logs, dated 7/28 and 7/29
 Oyster Creek Operations Logs, dated 8/23
 Oyster Creek Operations Logs, dated 8/27, 8/28 and 8/29

Section 40A5: Other Activities

Procedures

SY-AA-103-513, Behavioral Observation Program, Revision 8
 305, Shutdown Cooling System Operation, Revision 107
 307, Isolation Condenser System, Revision 113
 308, Emergency Core Cooling System Operation, Revision 89
 310, Containment Spray System Operation, Revision 102

Drawings

3E-214-A2-1000, Sht. 4, ISI Configuration Drawing Shutdown Cooling System, Revision 3
 GE 148F262, Emergency Condenser, Revision 53
 GE 148F740, Containment Spray System, Revision 43
 GE148F711, Shutdown Cooling System, Revision 44
 GE885D781, Core Spray System Flow Diagram, Revision 72
 JCP-19433, Shts. 1-6, Isolation Condenser System, Revs. 2, 3, 3, 4, 3, and 2
 JCP-19434, Shts. 1-3, Shutdown Cooling System, Revs. 2, 3 and 5
 JCP-19436, Shts. 1-11, Containment Spray System, Revs. 3, 2, 2, 2, 2, 2, 2, 2, 2, 2, and 2
 JCP-19440, Shts. 1-11, Core Spray System, Revs. 2, 3, 2, 2, 2, 2, 2, 2, 2, 2, and 2

Condition Reports (IR)

954765	1263536	1240313	1228883	1236753	1239120
1239386	1239094				

Work Orders

R2169237 R2170284

Miscellaneous

Supervisory Brief, Important Security Information, dated 6/17/11

Nuclear General Employee Study Guide, dated 3/31/10

NRC Letter IA-2010-009, NRC Investigation Report No. I-2009-047, dated 4/12/10

NRC Letter EA-2010-007, NRC Investigation Report No. I-2009-047, dated 4/12/10,
(ML101030075)

Security Incident Report number 2009-141

VPF 1259-18-1, Instructions for Installation, Operation and Maintenance of Heat Exchangers,
Revision 0

LS-AA-126-1005, Managing Gas Accumulation Self-Assessment, dated 7/15/11

EAS-57-0989, Design Basis Document for Containment Spray System, Revision 5

Letter from K. R. Jury (Exelon Generation Company, LLC/AmerGen Energy Company, LLC) to
USNRC, "Three Month Response to Generic Letter 2008-01," dated 4/11/08

Letter from K. R. Jury (Exelon Generation Company, LLC/AmerGen Energy Company, LLC) to
USNRC, "Nine-Month Response to GL 2008-01," dated 10/14/08

Letter from P. R. Simpson (Exelon Generation Company, LLC) to USNRC, "Response to
Request for Additional Information Regarding Generic Letter 2008-01," dated 1/28/10

Letter from P. R. Simpson (Exelon Generation Company, LLC/AmerGen Energy Company,
LLC) to USNRC, "Supplemental Response to Generic Letter 2008-01," dated 1/20/09

Oyster Creek Nuclear Generating Station - Technical Specifications, Amendment 280

Oyster Creek Nuclear Generating Station Updated Final Safety Analysis Report, Revision 16

SDBD-OC-212-A, Design Basis Document for Low Pressure Core Spray System, Revision 3

GENE-B13-01805-77, Evaluation of Condensation-Induced Water Hammer for Core Spray Line
of Oyster Creek Nuclear Generating Station, dated 9/1996

NRC GL 2008-01 Containment Spray System Evaluation, dated 8/19/08

NRC GL 2008-01 Isolation Condenser Evaluation, dated 8/19/08

NRC GL 2008-01 Shutdown Cooling System Evaluation, dated 8/19/08

NRC GL 2008-01 Core Spray System Evaluation, dated 8/20/08

NRC GL 2008-01 Venting and Gas Accumulation Evaluations for ECCS, Revision 0

LIST OF ACRONYMS

ADM	Administrative Procedure
BCO	Basis for Continued Operations
BVPS	Beaver Valley Power Station
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report(s)
FA	Functionality Assessments
FENOC	First Energy Nuclear Operating Company
IMC	Inspection Manual Chapter
IOD	Immediate Operability Determination
IP	Inspection Procedure
ISI	Inservice Inspection
LCO	Limiting Conditions for Operations
LER	Licensee Event Report
MR	Maintenance Rule
MSP	Maintenance Surveillance Package
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OD	Operability Determinations
ODCM	Off-Site Dose Calculation Manual
OST	Operations Surveillance Test
PI	Performance Indicator
PI&R	Problem Identification and Resolution
POD	Prompt Operability Determination
PMT	Post Maintenance Testing
REMP	Radiological Environmental Monitoring Program
SSC	Structures, Systems, and Components
SWS	Service Water System
TLD	Thermo-Luminescent Dosimeter
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report